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The risk of infective endocarditis following interventional pulmonary valve implantation. A Meta-Analysis

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Background: Interventional percutaneous pulmonary valve implantation (PPVI) was first reported in 2000. Today two different valves are certified for this procedure (i.e. Medtronic Melody® valve and Edwards Sapien™ valves): the procedure became commonly available and was increasingly used from 2010 onwards. For a decade studies have reported an increasing risk of infective endocarditis (IE) after PPVI; patients for PPVI are usually younger and with decades of lifespan to come, therefore even a low annual incidence of IE is important. The overall incidence and a potential difference between the valves however remains unclear.

Methods: A systematic literature search was performed in the databases Medline, Cochrane Library and Embase including the clinical trials register. The time period was between 01/2000 and 12/2018. The aim was to summarize and compare the cumulative incidence of IE after PPVI. In addition, at a sensitive analysis we set the incdence rates of the two valve types in ratio with a normal population.

Results: A total of 967 publications were identified searching for „pulmonary valve implantation“, „PPVI“, and 47 publications were used for final analysis. 3616 patients with Melody® valves and 501 with Sapien™ valves were included. IE after PPVI occurred in 214 patients with Melody® valves and in 5 patients only with Sapien™ valves. The pooled incidence for Melody® and Sapien™ valves was 4.9 percent (95% CI: 3.6 – 6.2) and 1.3 (95% CI: 0.3 – 2.3) respectively. Chi-square test was significant. The sensitivity analysis showed that the incidence rate ratio was 252.1 (95% CI: 187.6 – 338.6) for Melody® valves and for Sapien™ valves 2.7 (95% CI: 0.8-9.2).

Conclusions: PPVI is the treatment of choice wherever feasible; since all biological valves have a limited lifespan and due to the relatively young age of the majority of patients, the cumulative risk of IE is of particular importance. Based on the data presented, one of the two catheter valves currently available clearly is superior with regard to the risk of BE. The reason for this is unclear, but it seems likely that the different biological material as well as the mode of preparation may influence this outcome.